

From the house of Amar Chitra Katha and Tinkle

BRAINWAVE™

SCIENCE IS JUST A GAME

Vol. 03 Issue 02
February 2014
48 pages
8-15 years
₹60

Animal Kingdom
Why study it?

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Sci-Q quiz!

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for your buck!

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LEAD ▶ START
Publishing

The consistently high production quality of Brainwave is a pleasant surprise to me every time I see a new issue. The artwork is engaging with a wise selection of diverse content. I believe Brainwave is well on its way to be a premier publication for kids - Rohit Kumar, Scientist at Raytheon BBN Technologies, Cambridge, Massachusetts.

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BEHIND THE SCENE

BRAINWAVE

Vol. 03 | Issue 2 | February 2014



THE BW SOFT BOARD

AT BRAINWAVE, WE STRICTLY BELIEVE THAT THE ATMOSPHERE FOR WORK NEEDS TO BE RIGHT. HENCE, THE SOFT BOARD BECOMES AN INTEGRAL PART. JUST SHUT DOWN THE LAPTOP SCREEN AND GET TRANSPORTED INTO THE WORLD OF ILLUSTRATIONS AND LETTERS.

THIS, IS THE DESK OF THE ASSISTANT EDITOR, PRIYANKA TALREJA. SHE LOVES FEEDBACK AND MORE THAN THAT, SHE ADORES YOUR HANDWRITTEN LETTERS.

SO, MAKE SURE YOU SEND US AT LEAST ONE LETTER BY POST SO THAT SHE CAN PUT IT UP AND LOOK AT IT WHEN SHE NEEDS A BREAK!

What do you think about our 'Behind the Scene' snippets? What more would you like to know? Shoot an email to brainwave@ack-media.com

Cover artwork by Saudamini Tambay



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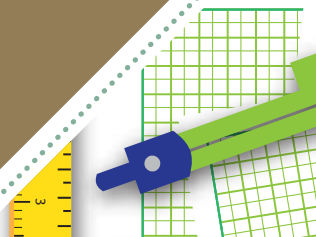
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MEET THE SMARTIES

Beyond the skies, trouble brews.
Danger awaits us, all humans!
Sneaking and lurking in the dark,
Someone's plotting to tear humanity apart.

Much before they act, our friends arrive to
thwart the attack,
1... 2... 3... Go! The Smarties arrive fast.
Yes they are here, look!

The Smarties rarely punch down opponents -
they are peace lovers.
They use not only brawn, but also brains!

The battle's won; let us meet them now,
They are real heroes - take a bow!

Dr. Dodo, dear friends,
is the only **Dodo** alive.
The wise elderly scientist,
his ideas save many a life!



Skree! is mysterious,
a bearded Toda lady.
Up her sleeves,
she has tricks aplenty!



Young Arby is the great
Indian mathematician.
Sucked into BW Labs by
Dr. Dodo's time-machine,
Grow up to be Aryabhata,
yes he will fine!



Young Alby's none other
than Albert Einstein.
Sucked in time by
Dr. Dodo's Galileo one,
He will soon change the
history of science!



Mr. X is the antagonist,
Top IQ of the universe
is his! Opposing ideology
than the Smarties,
Is he good? Is he bad?
You analyze.



Earth, wind, water and
fire combine to make
Bhoo - an enigma,
She is a superhero -
every villain's dilemma.



Now that you know them, see their wonders,
The episode begins, the Earth's saved
from plunder.



WHEN IGNORANCE IS NO BLISS...



The importance of kingdom animalia is significant. Imagine a world without any animals! From our pets, the dogs and cats, to butterflies and bacteria, kingdom animalia is made up of millions of members. We, human beings belong to this group too.

Out of the 8.74 million species

of living beings on Earth, 7.77 are believed to be animals! But, animals are dependant. Survival of each depends on the other. So, the importance of kingdom animalia is more significant than it seems to be.

And we cannot ignore any of them. For instance, what would happen if there were

no **scavengers^G** on the Earth, to keep it clean of all the dead and waste that would otherwise be a feast for harmful bacteria and fungi?

So, isn't it necessary that we refuse to be ignorant anymore? Dig deeper and learn more.

- SK, sasikanth.c@ack-media.com



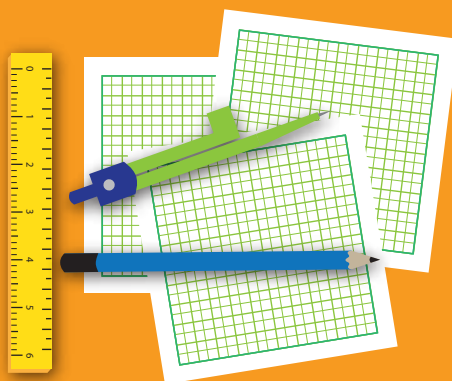
Honeybees teach geometry

by Pushkar Samant

Mr. and Mrs. Bee explain about their house through maths, with proper geometric diagrams!

You need:

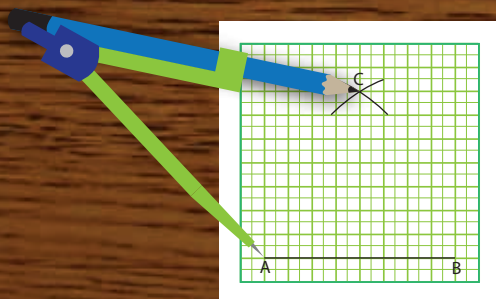
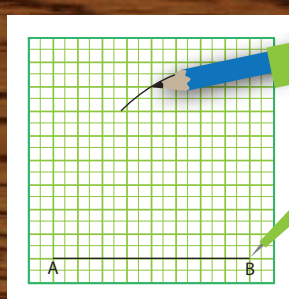
- A geometric compass
- 3 sheets of graph paper (10x10 cm)
- A pencil
- A ruler



Method:

Step 1

On one piece of the graph paper, draw a horizontal line AB of 8 cm length. Place the point of the compass on B, set it up such that the distance of the pencil from the point is equal to AB and draw an arc as shown.

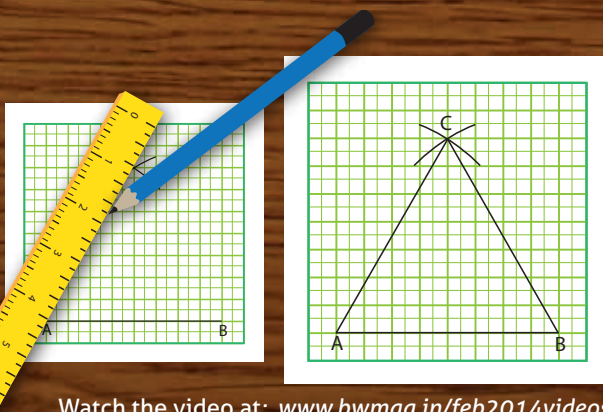


Step 2

With A as the point of the compass and AB as the distance, draw another arc intersecting the first arc. Let's name this point of intersection 'C'.

Step 3

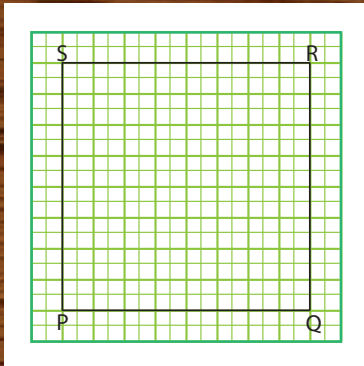
Join CA and CB. The resultant geometric shape is an equilateral triangle.





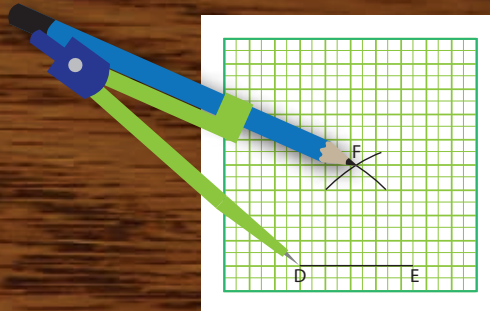
Step 4

Draw a square of 8 cm side on another sheet of graph paper.



Step 5

On the third sheet, draw a horizontal line DE of length 5 cm

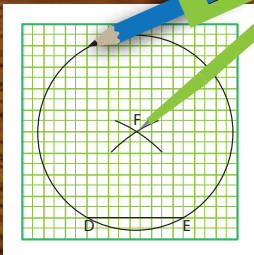


Step 6

With D and E as the points and DE as the distance, draw intersecting arcs as shown.

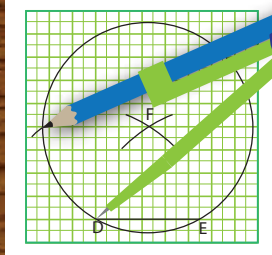
Step 7

Now, with 'F' as the center and DE as the radius, draw a circle as shown.



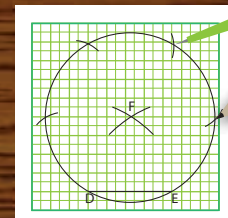
Step 8

Place the point of the compass on D and draw an arc intersecting the circle at a distance of DE from D.



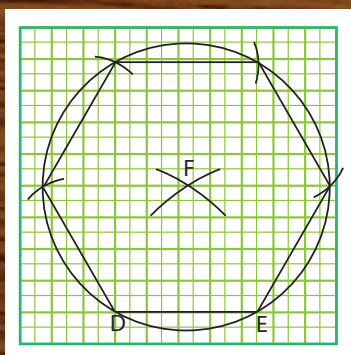
Step 9

Place the point of the compass on the intersecting point and draw another arc intersecting the circle. Continue this till you get 4 intersecting points.



Step 10

Join all the arcs to form a hexagon, as shown.



What did we do?

Mr. and Mrs. Bee tell us that for a honeycomb, the perimeter should be as minimum as possible and the area should be maximum. They make their homes with beeswax. They say that approximately 1 kg of wax is made from 8 kgs of honey, which is expensive. That is why they chose hexagon, which provide more area for less perimeter. The structure is also compact and doesn't waste any space.

In this activity, we actually verified the fact by drawing a square, a triangle and a hexagon, and comparing their perimeters and areas. The hexagon has the maximum area and minimum perimeter indeed! Now you all have to tell me why we chose these three shapes only.

What are the perimeters and areas of the triangle, square and hexagon we drew in this activity?? Research and email your answers to brainwave@ack-media.com to win two cool ACK comic books!

Silk Routes

Written by : Jonna Carlo

Artwork by : Parvati Pillai

Plants are our heroes. Not only do they supply us with food peppered with gobs of nutrition, but they also provide us with our second most important necessity – clothing.



But lets not forget the poor sheep and silkworm, yes? We get all our wool from sheep and silk fom the cocoon of the silkworm. But wait, how on earth do cocoons transform themselves into saris? Lets find out!



After lengthy research, the Chinese concluded that two things are key to produce high quality silk – preventing the pupa from breaking the cocoon and balancing the diet on which they feed. It is thanks to their ways then, that we have access to such a variety of silks today!

Around two thousand years ago, the Chinese discovered silk. Recognizing its value, they kept their discovery all to themselves. Apparently, it was the most guarded secret in history!



Just like raising crops is 'agriculture', raising silkworms to obtain silk is called sericulture. Sericulture or silk production has a colourful history unknown to most. Long ago, it was thought that our heroes, plants, played a role in obtaining silk. Boy, were they wrong!



But, what is the process like? Well, first the female silk moth lays eggs, from which hatch larvae, referred to as caterpillars or silkworms.



After growing for a bit, the larvae enter into the next stage of their life – pupa.



During the pupa stage, the silkworm weaves a cocoon around itself.



For this purpose, the silkworm secretes fluid fibres made of a protein that hardens on exposure to air and becomes silk fibre!

In short, each larva forms a cocoon of silk fibers around itself, turning itself into a pupa that further develops into what we call the moth. The moth then flies out of the cocoon.



We generate silk fibres that are as strong as threads of steel from the cocoons!



Today, man-made fibres have replaced silk for many uses. Yet, the world silk production has approximately doubled during the last 30 years.

While China and Japan have been the two main producers of silk, the former is the leader by miles!



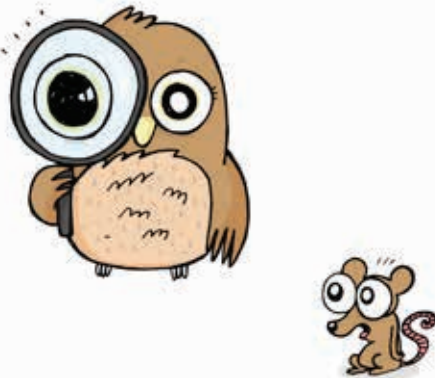
To encourage sericulture, many governments such as Nagaland are providing training programmes for the production and post harvest of silk. All, to help farmers produce more in a sustainable and self-sufficient manner.



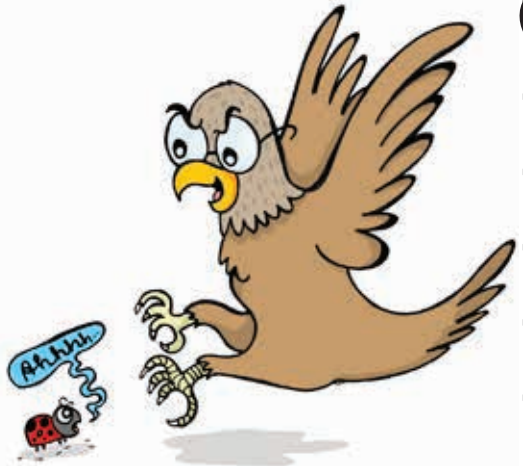
Fun Fact: Some butterflies have ears on their wings!



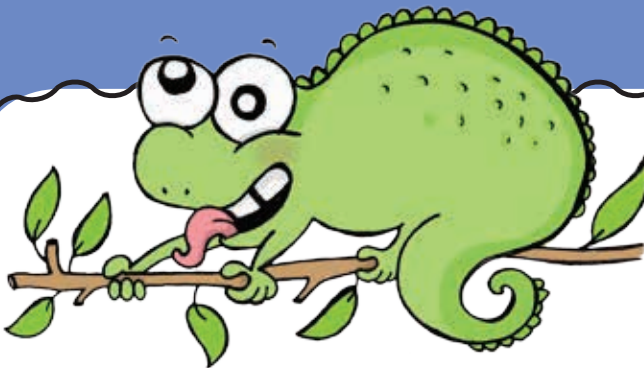
The End.



An owl has a wider pupil and increased retinal surface to collect more light so that it can see in the dark. It can spot a mouse scuttling 150 feet away in light as dim as that of a candle!



A falcon has a superior retina that enables it to spot a 10cm object from a distance of 1km. It can also see sharp images even when it dives at very high speeds!



A chameleon has eyes that move independently, allowing it to see in two different directions at the same time!



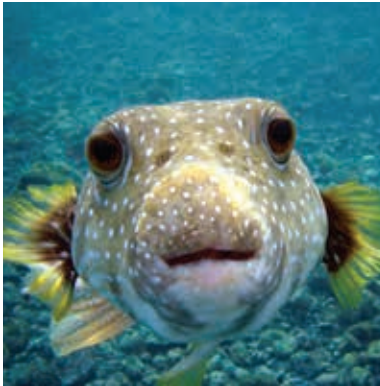
Seawater fish survival skills!

Nature provides us with some amazing examples of survival. One of them is the case of the seawater fish.

The magnesium ion, Mg^{2+} , is the second most abundant **cation^G** in seawater. It has been observed that unnatural absorption of any one ion by the body can be damaging for any creature. So, seawater fish have to ensure that the level of Mg^{2+} in the plasma of their bodies doesn't cross a certain limit. They do this by secreting the excessive Mg^{2+} through their urine, and avoiding an excess of absorption of Mg^{2+} from their surroundings.

However, some species of fish are capable of living in both salt and freshwater conditions, and how they alter Mg^{2+} secretion in their bodies accordingly was previously not understood.

Now, researchers have observed that this task is done by a gene called *Slc41a1*, which is **up-regulated^G** when the fish move from freshwater to seawater. If this gene had not been doing this job, due to excessive Mg^{2+} , the fish would face failure of normal tissue functions in the nerves, muscles and heart. ■



Early exposure to insecticides makes amphibians more tolerant later

A new study reveals that early exposure to insecticides can make the animals tolerant to them later.

A team of scientists conducted experiments with both embryos and hatchlings of the wood frogs. Both embryos and hatchlings from different environments were first exposed to a low, non-lethal concentration of insecticides.

They then exposed the same samples to a lethal concentration of the insecticides at the tadpole stage and measured their mortality rates over the course of several weeks.

The team found out that the tadpoles produce greater amounts of the enzymes that help them with higher tolerance levels to the insecticides!

This is an important discovery as various amphibian populations are declining worldwide due to pesticides and insecticides.

This discovery has promising implications for the persistence of amphibian populations. ■



Algae get stressed by light

Gelidium corneum is a very common algae along the Basque coast. It grows at a depth 3-15 metres. This algae gets broken up by storms and washes up to the beaches where it forms a red carpet.

On some parts of the coast, the algae have turned yellowish. Researchers have identified this change as a symptom of stress.

During summers, the algae are exposed to increased solar radiation and hence, suffer greater stress. ■



Marked Territory

Dr. Dodo is all set to take our design team out on a trip to a secret nature reserve. In the end, a really mysterious incident that charms the whole team unfolds.

Let's creep into nature's enclave.

.....
by Priyanka Talreja

On a fine bright day, the Brainwave HQ looked normal. Browine, the dog was lazing around while all the BWites were staring into their computers.

Suddenly, the normalcy ended with a loud shriek.

"AAAAA!" yelled Kashmira, the design lead.

"What is it Kashmira?" asked Saudimini, the illustrator and designer.

"This, this email ..." was all Kashmira could manage.

"What email? What about it?" Saudamini asked again.

"People!" yelled Kashmira, who had by then collected her thoughts. "You won't believe the news I have to share. I had written to Dr. Dodo requesting him to take us out on a trip before work on the issue, animalia, starts. I thought if we could get a guided tour, we would be able to illustrate better."

"That's a great idea!" exclaimed Sarthak.

"Yes, and now, Dr. Dodo has replied to my

mail saying he would take us out to a secret nature reserve! Very few know about this reserve. And we have to leave right now! The mail says that his super-plane is waiting for us on the terrace."

At this point, there were excited shrieks from everyone, so much so that Brownie got scared and ran out of the HQ.

In a flash, the design team reached the terrace and was stunned. They saw a black mini-jet waiting for them. They quickly hopped in and took off.

Within no time, the design team landed on a really green patch of land. There was a small wooden arch a little ahead of them.

They entered the arch to see a jeep waiting for them. Dr. Dodo was comfortably seated on the driver's seat. "Hop on brainiacs. We don't have much time," he said.

"Thank you for accepting our request Dr. Dodo," Kashmira said with a big smile and plonked herself on the seat behind Dr. Dodo. She was still in a trance, it was obvious.

Dr. Dodo kicked the jeep to life and said, "Let's start. This is the first time in 2 years that I am coming to this site. So, we will be



picking up a guide.”
And the jeep took a smooth turn.

Just around the corner, they saw a man with a big beard and even longer hair. There was so much hair over his face that you could barely see his features.

The car stopped.

“Hello people, I am your guide for the day. I was told that I have to show you the gems that this reserve holds. We have some unique animals. You will be pleased to meet them. Please take a left, Dr. Dodo,” said the man, hopping in.

“Do you know how important animals are to mankind, brainiacs?” asked Dr. Dodo, as he drove with precision. “Since you guys get to shape young minds, you must know it.”

“Look to the left! That’s the Asian Elephant,”

interrupted the guide.

“Did you guys know that the Asian elephant, *Elephas maximus*, has been listed as endangered?” continued Dr. Dodo, as the team stared at the gentle beast. “These elephants are threatened by habitat loss.”

“Oh! I did not know that,” said Saudamini.

“This is the most important thing you need to know, brainiacs,” said Dr. Dodo. “The thing is that the ecosystem can’t be normal without all your animal friends.”

“Yes,” said the guide. “We need these animals for so many things! But, we just don’t seem to understand and value it!”

As the guide said this, Dr. Dodo gave the BWites a glance and asked, “Tell me what you know dear children, why do we need animals?”

"We need them for each thing we do," interrupted the guide, who seemed overwhelmed with emotions.

"We need the little butterflies for pollination and germination. The scavengers keep the Earth clean. Animals are part of the food chain and maintain the balance of ecosystems. They serve as companions too, helping reduce depression and loneliness. Animals also serve humans to accomplish many tasks. In fact, we need them for everything!" said the guide, almost upset.

"Yes, you are right dear man, but there is much more," said Dr. Dodo.

"Animals provide humans with fur, hide, leather, ivory and bone, which they use for clothing, tools, etc. They are the main source of food. Animals are used in medical research and testing. Some very significant medical discoveries have been possible due to such researches. Animals can be beneficial in controlling the population of poisonous animals and plants, and keeping down rodent and insect populations that carry diseases. Animals are your support system in many ways than you can imagine."

"Oh look! Pug marks! There's a tiger nearby!" exclaimed the guide suddenly.

As the jeep moved further, they saw a tiger standing right in front, blocking their path. It circled the jeep and let out a loud roar.

Soon, a bunch of cubs came on to the path from nowhere and surrounded the tiger. The tiger left the jeep alone and moved away from the path along with its cubs, leaving everyone speechless.

Finally, Sarthak broke the silence. "I know this stunning species is critically endangered too..."

"It is!" said Dr Dodo. "I think we should turn

back and take a different direction now. We have entered the marked territory."

As the journey continued thus, the guide showed the team some beautiful animals like the chital, the black buck, langurs, leopards and black bear. There were some alien species too, due to which the reserve got the 'top secret' status!

Before they knew, the Sun began to set. Though reluctantly, they had to wind up the journey and travel back to the plane. As the jeep smoothly cruised back, the only sound to be heard was that of distant wolves and bats. The BWites were in deep thought, chewing on all that they had just learnt.

Before they knew it, they had reached the arch. The super-plane was waiting for them.

"We don't feel like leaving just yet, Dr. Dodo," Saudamini said.

"But you have to, dear team. Please remember the things you learnt and convey them to your young readers. Let them know the value of animals," said Dr. Dodo, with affection in his eyes.

"We will, Dr. Dodo. Thank you again! We would like to thank the wonderful guide as well!" said Kashmira.

When they turned around to thank the guide, they saw that he was gone! There was a metallic 'X' placed on the seat where he sat until a few minutes ago.

"Xavier!" exclaimed Dr Dodo.

"Was that Mr. X?" queried Sarthak, stunned.

"Yes. That indeed seems to be my once beloved student. He seems to be putting in some effort to love and hence, educate humans instead of scheming to eliminate them!" Dr. Dodo said, with a smile. ■

NEW KIDS ON THE BLOCK

by Priyanka Talreja

The folks at the BW HQ have accomplished a great task! They all got together and went about looking for the unknown. Now, we bring to you a one-on-one interview with the four awesome new species that have shown-up on our planet.



Olinguito

Hi! Pleased to meet you. I am what the humans call the Olinguito (oh-lihn-GEE'-toe).

If I had to describe my physical features, I could tell you that I am a raccoon-sized critter with a teddy bear face. I am not even kidding. I am a perfect example of what humans find "cute".

The Smithsonian researcher who has spent the past decade tracking me has found that I leap through the trees of mountainous forests of Ecuador and Colombia at night and thus am difficult to spot.

But let me tell you one thing. Humans are, well, not very intelligent. One of my kind was living in the Smithsonian-run National Zoo in Washington for a year and ended up being a case of mistaken identity. Can you believe that? The zoo authorities thought of her to be an olingos instead of a olinguitos!

Err, there is very clear difference between the two. We Olinguitos are smaller, have shorter tails, a rounder face, tinier ears and darker bushier fur. We are almost like fuzzballs. A cross between teddy bears and house cats. We eat fruit, weigh just about a kg and have one baby at a time.

That's enough about me. See ya later.
The sun has set and I am off.



Hemiscyllium halmahera

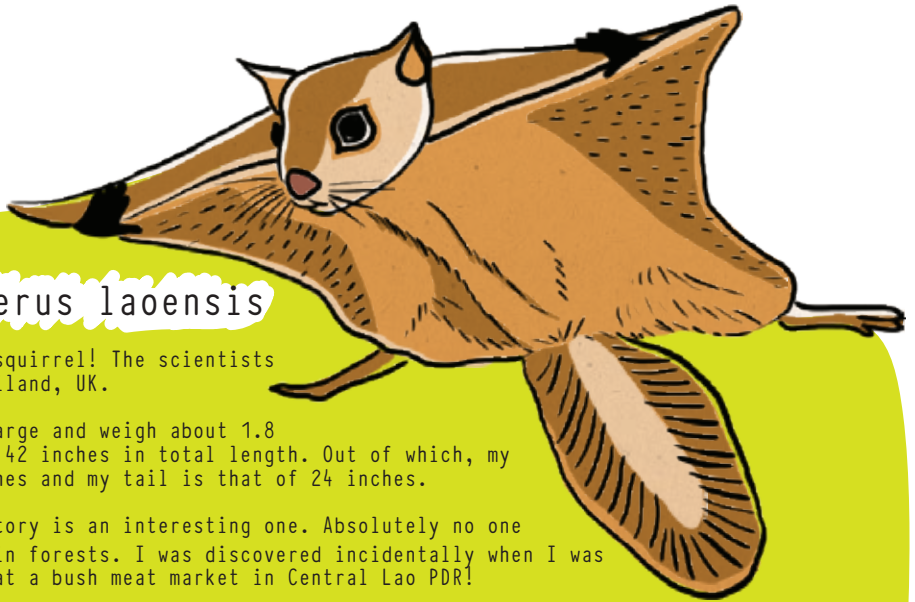
Go on. Laugh at me. I am the shark that walks.

Yes, I have been discovered just sometime back in waters off a remote Indonesian island. I use my pectoral and pelvic fins to "walk" along the sea floor.

Physical appearance wise, I am colored dark brown and have white spots on a light brown background. I am generally small and slender with a maximum length of up to 80cm.

The researchers from Conservation International and the Western Australian Museum, who were involved in my discovery, say finding me has important outcomes for marine conservation in the area.

Bye now, I have a long way to go. You see, I am a fish that walks.



Biswamoyopterus laoensis

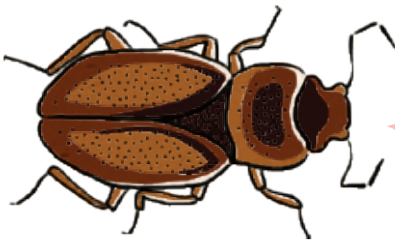
Heya! I am a flying squirrel! The scientists discovered me in Thailand, UK.

Physically, I am a large and weigh about 1.8 kg. I measures about 42 inches in total length. Out of which, my body is about 18 inches and my tail is that of 24 inches.

Believe you me, my story is an interesting one. Absolutely no one came looking for me in forests. I was discovered incidentally when I was on display for sale at a bush meat market in Central Lao PDR!

Colour wise, my upper surface is predominantly a mixture of dark reddish brown and black hairs, variably grizzled with whitish-gray.

If you read the news, a lot more will be said about me as and when these humans find the finder details. So for now, this is just how much you get. Goodbye there I fly!



Hydraena ateneo

Hello dear folks! I am the cool new beetle on the block.

I have an interesting story too! I could not wait for these slow humans to find me, so I just landed up in their habitat.

I was chilling in metropolitan Manila when students and faculty at the Ateneo de Manila University came sampling some of the waterways around the campus. They then pulled up a brown water beetle, that was me sitting right there in the middle of the Phillippine capital.

Haha, quite a story huh?

Basically, I am a tiny brown beetle just over one millimeter long and I have distinctive legs. I live in shallow, stagnant or slow-flowing fresh water beneath tree cover. I love to feed on the bacteria and fungi that collect around submerged leaves or gravel. Yum.

Oh look, there's some food. And I am s-t-a-r-v-i-n-g. Fungi, here I come!

Did you know:

Every year about 18,000 new species are added to the records of the Earth's biodiversity. To date, scientists have described and named about 2 million species on our planet. Unbelievably, these same scientists believe there are no less than 10 million more species that remain unknown and unnamed.

Sadly, however, some are going extinct before even being discovered. Others such as the adorable bug-eyed tarsier, known as the Siau Island Tarsier, were first described and put on "a critically endangered list" the same year. Quite a pity.



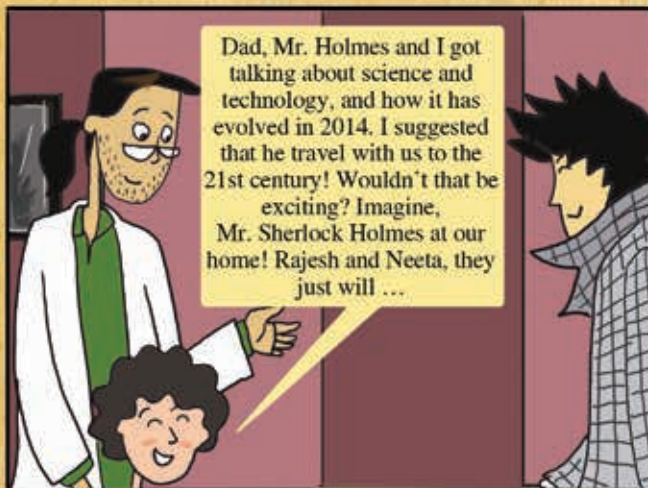
The Time Travelling Kumars

Sherlock Diaries 9

Written By:
Joanne Carlo

Illustrated by:
Sarthak Sinha

Previously ... After being separated during their time travelling adventures, Dinesh's parents track him down to 20th century London. Dinesh is with Sherlock Holmes at 221B Baker Street! Dinesh gets to know that Holmes is planning to retire to bee keeping in Sussex Downs and suggests that Holmes should travel with him instead, to the year 2014, and see how technology has evolved over the years ...



Dad, Mr. Holmes and I got talking about science and technology, and how it has evolved in 2014. I suggested that he travel with us to the 21st century! Wouldn't that be exciting? Imagine, Mr. Sherlock Holmes at our home! Rajesh and Neeta, they just will ...

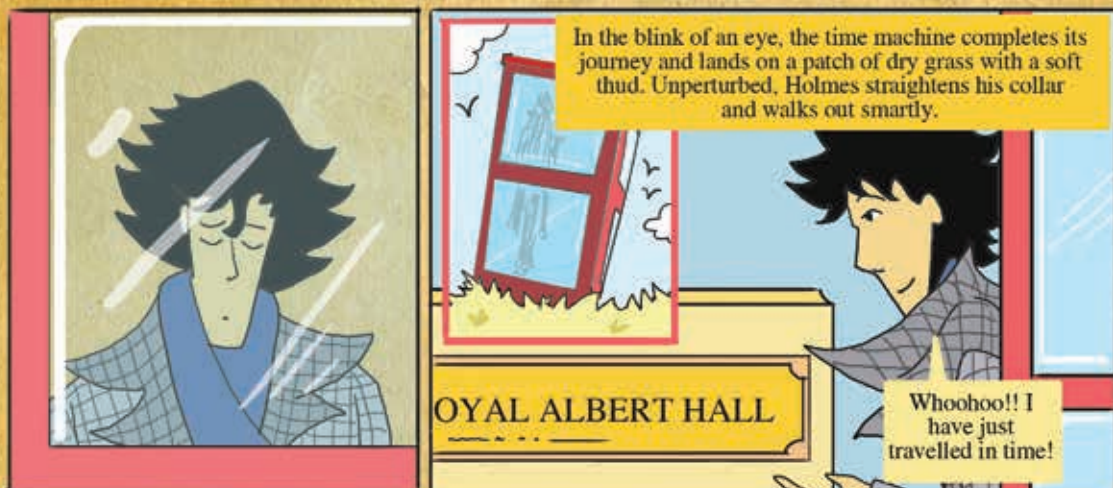


Son ... SON! That is indeed a brilliant idea! Sherlock Holmes in my lab – that would be an interesting experience, indeed! I could show him the ...



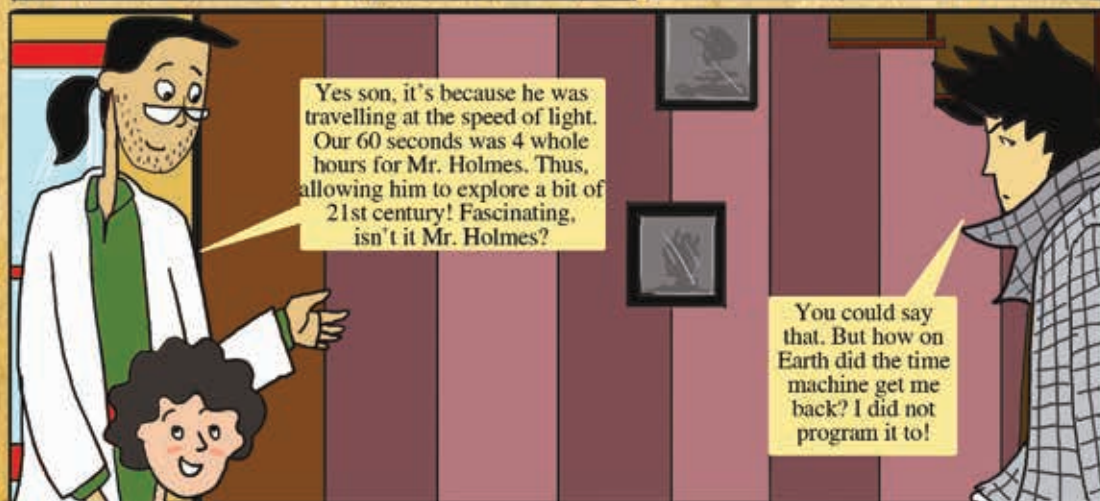
BOOM

Holmes, busy exploring the time machine while his guests are busy planning their trip, accidentally activates it!



A highly miffed Holmes, about to argue, suddenly realizes where he is and shuts himself up. He begins walking around the streets. Lost in the bright colours of 2014, he loses all sense of time. Suddenly ...



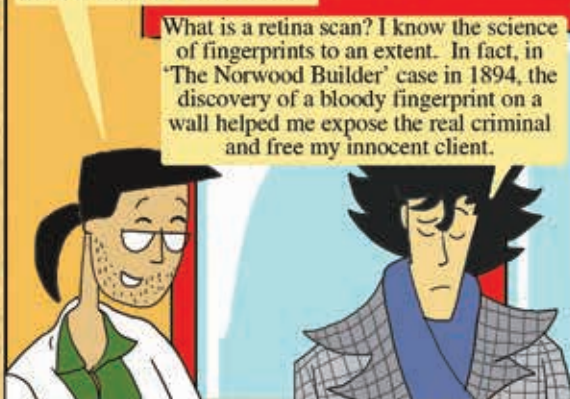


To discourage evil doers, I've programmed the time machine to respond to me and only me. It operates only with my fingerprints and retina scan!



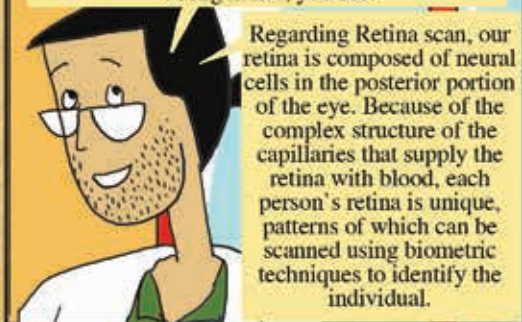
With your what?
Finger and retina prints?

Haha, not retina printing, Mr. Holmes. It's a retina scan.



What is a retina scan? I know the science of fingerprints to an extent. In fact, in "The Norwood Builder" case in 1894, the discovery of a bloody fingerprint on a wall helped me expose the real criminal and free my innocent client.

Yes, and the technology has vastly evolved since then. Today, technology uses scans of fingerprints and identifies the individual. I use it in my time machine to ensure that it cannot be stolen easily. Science can be dangerous in the wrong hands, you see.



Regarding Retina scan, our retina is composed of neural cells in the posterior portion of the eye. Because of the complex structure of the capillaries that supply the retina with blood, each person's retina is unique, patterns of which can be scanned using biometric techniques to identify the individual.

What is "biometric"? Something to do with biology, for sure!



Kind of! Biometrics is the study of how humans differ from each other based on biological factors such as fingerprints. Believe it when I say that even identical twins do not share the same set of fingerprints.

Oh, that's awful! You would've loved the Museum! Anyways, a Unique Identification Number is an alphanumerical code assigned by governments of several countries to their citizens and visitors!



Speaking of identification, those chaps at Albert Hall refused to let me in because I didn't have an identification card!

That's all very well. This 21st century that you come from seems very, very interesting. Imagine backpacking across the world!



Backpacking?

To be continued...



A Mixed Bag

*Big and small, Dr. Dodo
introduces us to one and all!*

by Dr. Dodo



The smallest known vertebrate, on the other hand, is a little frog so tiny, it could sit cozy on your nail,
It measures just 7.7 mm, oh dear, how frail!

Now, let's leap into the land of the fastest,
The cheetah zips by and your eyes wouldn't catch it.
Running at the speed of 120 km per hour,
This animal is faster than daddy's car!

The slowest is the three toed sloth, dear friend,
It does not move at all, for days on end.
When it does move, it's only at 3m in an hour,
This animal is so sedentary that algae grow on its coat fur!

Take a guess ... who the loudest would be?
Don't wrack your brain too much, it is the Howler monkey!
This monkey yells so loud, his calls sound up to 90dB,
That is just less than a train whistle, a shrill sound indeed!
When he yells at the top of his lungs, his call can be heard from 5km away,
Phew, this one surely knows how to express what he has to say.

Now that you know the fastest, loudest, smallest and the largest of all,
It is time for me to bid adios, till next time, see you all! ■

Animal kingdom spreads far and wide,
But let us tell you, it offers a lot in size.
Big and tiny, slimy and shy,
Let us take you by surprise now, say aye!

The largest is the blue whale,
Its tongue alone weighs 2,700 on the kg scale!

Until one has loved an animal,
a part of one's soul remains unawakened.



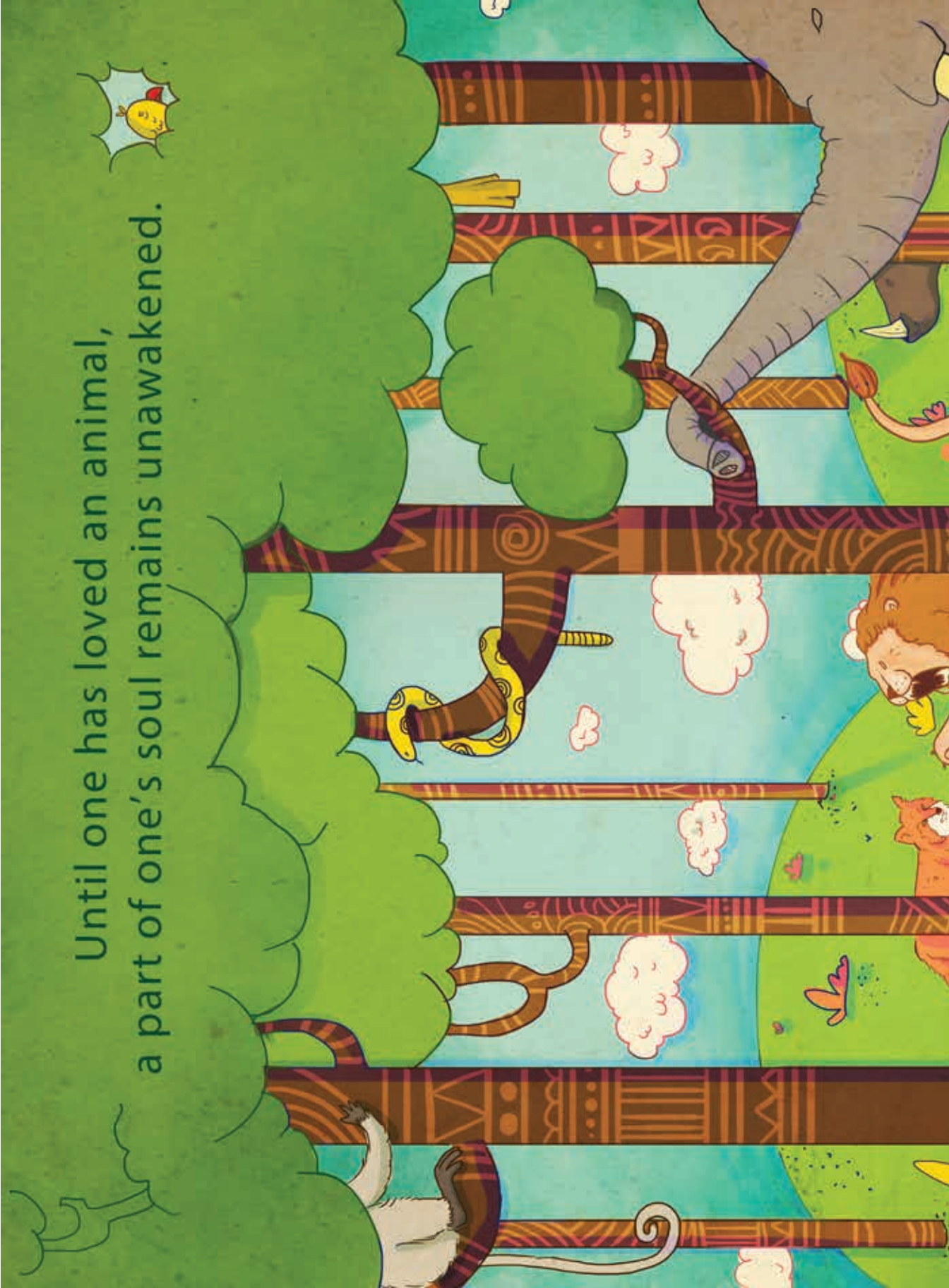
From the House of Anne Chynoweth and Thomas

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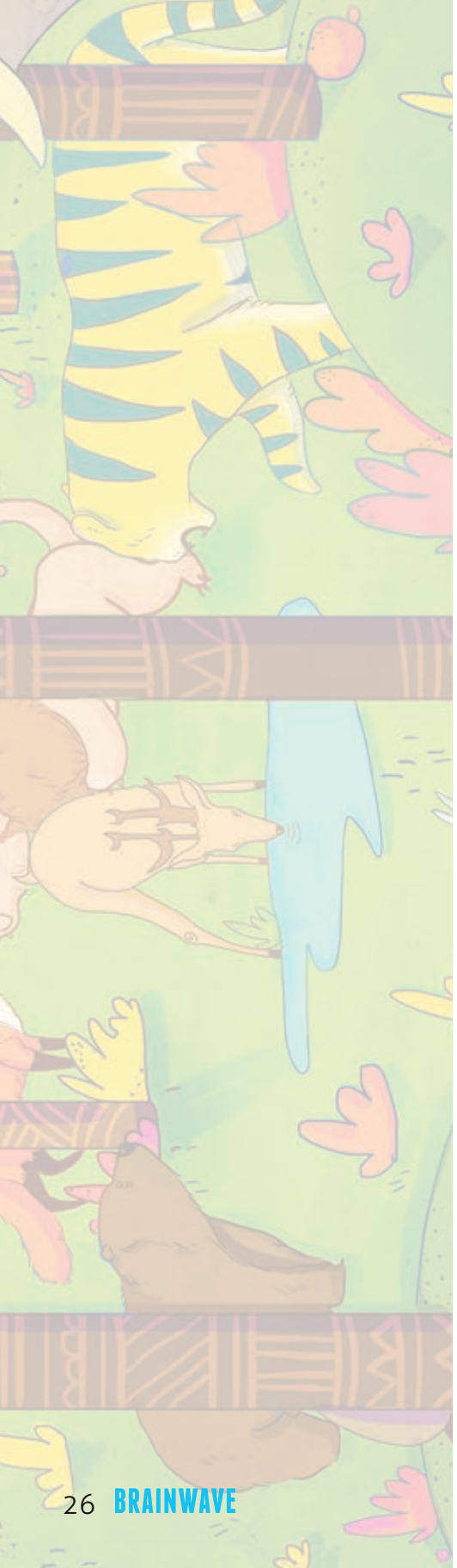
SCIENCE IS JUST A GAME



Until one has loved an animal,
a part of one's soul remains unawakened.







From the house of *Animal Crossing* and *Thomas*

BRAINWAVE™

SCIENCE IS JUST A GAME





Wacky Animal Awards

Get blown away with these top three, top wacky and top bizarre animal awards ever awarded, ever!

by Joanne Carlo

Chimpanzeed

What do you do when a chimpanzee's painting wins awards, acclaim and fame? A chimpanzee winning \$10,000 in an art contest is truly a symbol of evolution. Wait, did I just say evolution? I mean, didn't WE evolve from chimps? So shouldn't WE be winning ALL art prizes that were ever meant to be won, ever? Apparently not! Especially when we are pitted against Brent, a 37-year-old primate who paints with his tongue. Yes, you read it right!

When approached, a spokeswoman said Brent was unavailable for comment. Well, I guess it's about time we began paying more attention in art classes, isn't it? Let's give it up for Brent, whose talent is truly God sent – hoot, hoot, hurray!

Ugly is in

Do you love all animals? Tall, short, fat, thin, every single one? Do you also love the not-so-cute ones? I mean, do you really, really agree that all the cute and fluffy animals have been hogging the limelight for far too long – driving poor, ugly animals to extinction? Well, no more!

The slimy spikies too deserve not only love, but also a bit of limelight. So, we are glad that there's a competition that offers them just that! With an aim to crown 'the world's ugliest animal', this competition is held by the Ugly Animal Preservation Society (yes, that exists!). With 12 competitors in the fray, there's no time to stand and stare. Come on now, vote for the hottest ... errr, ugliest!



Artwork: Saudamini Tamboy

Holy Turtles!

Why would anyone smuggle turtles in suitcases? Yes, you heard it right, turtles! And not just few. More than 400 tortoises were being smuggled from Bangladesh in three suitcases! This just went beyond bold, to dangerous. Not for us, hale and hearty humans, but for the poor lil' turtles of course! Sold illegally in Bangkok for insanely exorbitant prices, we are relieved that these rare, lil' ones got rescued! And here, we keep wondering why all exotic species are endangered. Three cheers to the brave turtles, wriggle, wriggle, HOORAY!

Did you know?

Turtles lived on Earth before dinosaurs did! ■



A Brave Act

idea by Mukund Rao, 12



When Mukund goes to the Vandalur Zoo, the unexpected unfolds!

I love animals. Last year, I got a chance to express my love for these fellow beings when we went on a school excursion to the Vandalur Zoo in Chennai.

Our school had taken us on the trip so that we could understand the concept of 'pheromone'. Our teacher, Prof. Suraj, was explaining this concept by showing us various species of animals. We were told that pheromone is a chemical that animals produce in order to cause changes in the behavior of other animals.

Often, pheromones are described as behavior-altering

agents. Pheromones can be secreted to trigger many types of behaviors. I was stunned to learn all this as, till then, I had thought that animals communicate only via sounds and signs. It was great to know that animals use chemistry!

As we walked ahead, we were disappointed to know that we could not feed the animals.

Soon, we were near the lion's den. There, I saw that a poacher was trying to shoot the lion! To my surprise, no one was noticing him. It was a do or die situation. I quickly picked up a stone, took aim and threw it at the poacher's

head. Thankfully, that knocked him down!

I ran and kicked his gun away. People around me were stunned. I then reported the poacher to the police. After some days, I got more good news - the poacher sells Lion skins to a company in Thailand, and the owner of that Thailand company has been arrested as well!

I was very happy that I could save an animal's life. ■



Write a sci-fi story in not less than 150 words & email it to us at brainwave@ack-media.com. 2 best entries get to win 2 Percy Jackson DVDs from Excel Home Entertainment.

Winners of various activities in the December 2013 issue are:

Toy Box: **Sushmit Deb**

Ask Us Why: **Omar Rihas**

DIY: **Malhar Joshi**

Fan Fiction: **Yashvi Jaju**

Celeb Science: **Vishwas Adiga**

Rangeela Gift Hampers: **Abishek Devendran, Abhilash Baruah & Harsh Manwani**

Sci-Q Time: **Atharva Sahu**

Treasure Hunt: **Simra Siddiqui & Anusha**

The BW Smartenstein title, certificate & mystery gift for March go to **Kush Agarwal**. Visit www.bwmag.in/category/bw-smartenstein

All winners should email their complete name, age, class, school, address and **passport size photograph** to brainwave@ack-media.com to claim their prizes.

January 2014 winners will be declared in the March 2014 issue.



Letters from Readers

Hi team BW! Brainwave is just awesome! And this January's edition rocked! But, I missed the Time Gliders!

Anusha Krishna, Via email

Dear Anusha, Time Gliders season 2 shall soon begin. Keep a look out!

SK, Editor

Dear team Brainwave, Happy New Year 2014! Back in August 2013, I was declared the winner for Toy Box, Magic Science, and Smartenstein. I was told that I would receive the softcopy of 'the Totally Fun To Do Science' book as soon as possible. I have not yet received it.

Tanmay Gupta, Via email.

Dear Tanmay, the DIY book will take one more month to be edited, proofread and released.

Sorry for the delay.

SK, Editor

I'm a great fan of the posters in Brainwave every month. I'd like to know more.

C R Arthy Shakthibala, via email

Dear Arthy, your wall is filled with these posters, I guess. Why don't you send us a picture of it? We will publish it!

SK, Editor

I like your magazine. Brainwave is the best magazine for me. It taught me to love science. Could you please publish about universe and space technology in the next issue? Could you please give some tough DIYs in the next issue? Thank you!

Abhilash Baruah, Via email

Dear Abhilash, did you check out the DIY videos on our youtube channel?

SK, Editor

Dear readers, from now on, please send us your passport size photographs along with the letters. Wouldn't it be great if we could publish your pictures too, wherever possible?

by Sasikanth C

Like Humans, do trees stop growing after a period of time?

- Erick Joshua

A tree needs to keep growing in order to survive. They can never stop growing. That is the way nature works!

Unlike animals, trees have no mechanism to repair internal damage. They can do this only by adding a new layer of trunk. If they ever stop doing this, they will be unable to repair themselves and hence, die. That is why we can see growth rings in trees, and they keep growing wider every year.

However, we can believe that trees do stop growing in height after a while. Just like in humans, the slowing in the growth of height in trees is related to old age.

Some scientists suggest that tree cells are like animal cells - they stop growing after a number of divisions. Others suggest that as trees grow in height, the difficulty of pulling water from the ground all the way to the top would be more. Hence, growth stops. ■

Do Animals Dream? How are their dreams different from ours?

- Nachiketa S R

Our dreams involve replaying events or parts of events that occur to us when we are awake. Researchers at the Massachusetts Institute of Technology (MIT) reported, for the first time in 2001, that animals too seem to have complex dreams, and are able to retain and recall long sequences of events while they are asleep, just like humans do!

Studies showed that the brains of all mammals follow the same series of sleeping states as ours do. You should dig deeper into the fascinating lives of the animals, some of which have been our best buddies for generations. ■



Image Source: Wikimedia Commons

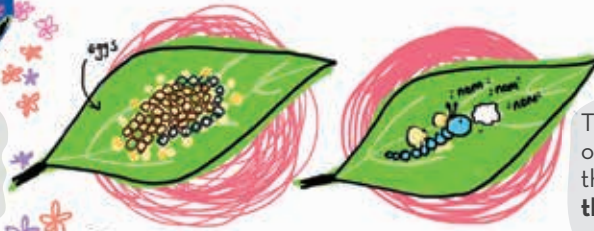
Have a burning question? Email us at brainwave@ack-media.com with 'Ask Us Why' as the subject. Two best questions get published and win a cool Amar Chitra Katha comic!



Absolem in wonderland

When Alice was in Wonderland, she met Absolem the caterpillar.
He told her his story ...

I don't remember my birthdate.
My parents told me that after
spending **few weeks inside the egg**, I merrily popped out.



The moment I came
out, I was **so hungry**
that I **started eating**
the leaf on which I
was!



I kept eating for many hours and days and weeks. I
ate flowers and leaves.

During
my long lasting **breakfast**,
I **shed my skin** several times.



I am **growing large in size**. And
there will come a time when I will feel like **resting** for
the time being. I **will need to find an** appropriate
place where I can **get good sleep**.

Thank it's
nap time!



I will find a
leaf and
anchor myself
underneath it. I
will weave a
cover around me so that no one peeps into my
personal life. My parents told me, "The
stage will come when you will feel like
having **rest**. It is called **pupa**."

I
will be
in that
cover for **several weeks**,
probably months. But, when I
break free, I will have
transformed into a butterfly.



Hearing this story, we at BW
became curious about the pupa.
Can you roam around in the park nearby and find as many cocoons as you can?
Send the photo of each to us to win a cool gift!

The End

The first ever BW Student Board is here. In the next 6 months, you will see them change the face of Brainwave. So, remember these names and wait for the next issue to see their pictures:

Advait Athreya, K Revanth, Ritvik Upadhyay, Udit Gowdety, Pratul Venkatesh and Mukund Rao.

The BW Student Board members work with our editorial team and make a difference to the magazine. Their work gets published and they receive an honourarium too!

For more information, visit:
www.bwmag.in/student-board

BW STUDENT BOARD

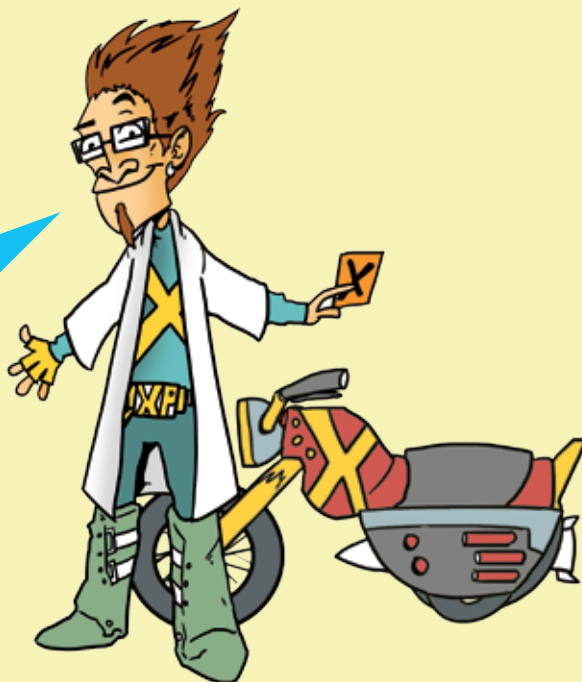


Join us on our Fun-do video channel as *Mr. X* performs some amazing experiments and *X-plains* the science behind them.

Mr. X will perform and publish your experiments too! Just email them to brainwave@ack-media.com



www.youtube.com/Brainwavemag



Artwork: Abhijeet Kini

Where animals rule

by Priyanka Talreja

'India' and 'animals' are two words that go completely hand in hand. How? Read on to find out.

This Month That Year: Ban on Animal Testing

February 2013 was a great month for India. In this very month, the DCGI (Drug Controller General of India) took the final step towards banning animal testing for cosmetics.

Soon, The Bureau of Indian Standards approved the removal of any mention of animal tests from the country's cosmetics standard. By doing so, India had successfully put a ban on animal testing for cosmetics. India is the first South Asian nation to do so! ■

What is animal testing?

Why is it a good thing that we have a ban on animal testing? Let's look behind the scenes to find out.

According to HSI (Humane Society International), during these tests, chemicals are rubbed on to the skins or dripped into the eyes of these animals. They are made to swallow huge amounts of chemicals to determine the dose that causes death. Often, at the end of a test, these animals are killed! ■

Blast From the Past: Animal husbandry

A great number of farmers in India depend on **animal husbandry** for their livelihood. In addition to supplying milk, meat, eggs, wool and hides, animals are a major source of power as well.

The gross output from animal husbandry was 358 billion INR in the year 1989!

Today, India has the world's largest dairy herd - over 304 million strong. It stands first in milk production, with 112.5 million tonnes of milk produced in 2009-2010. India is also the third largest egg-producer in the world, at over 180 million eggs produced a day in 2011-12. India is the world's sixth largest producer of poultry meat. ■

Peek into the Future: Animal welfare - Each drop counts

Making a difference in India is the IDA (In Defense of Animals), a non-profit grass root level animal protection organisation that aims at establishing and defending the rights of all non-human living creatures.

In a recent effort, the IDA achieved the target of sterilizing 400 dogs per month. It also started a 'Free Mobile Clinic for Street Animals'. Some of their future plans include an aviary for injured birds, a puppy pen and an OPD.

They also aim at starting a hospital for animals. It will include an 'x-ray Unit' and a basic 'Pathology Lab'. Post this, IDA INDIA will be a full-fledged hospital for animals! ■





ALL THOSE ANIMALS

by Priyanka Talreja

Image Source: Wikimedia Commons

Our world is full of creatures that make life better for us in more ways than one. But what are we doing for them? Here's a look.

LISTINGS:

February is the month of animals. If you are a proud animal lover, here are things you must know about February.

February is the National Pet Dental Health month. For a pet owner, it is critical to be cautious of the animal's oral health. This is because pets usually don't show signs of dental disease until it becomes extremely painful and prevents them from eating. Beyond problems in the mouth, lack of oral hygiene can result in bacterial infection that spreads from the mouth to the heart and heart valves, kidneys, and liver!

February is also the Responsible Pet Owners Month. If you own a pet, being responsible for its well being is critical. In the responsible pet owner's month, we urge all of you to be cautious about your pet's health. If you ever see a stray that needs help in India, call PAWS on the 24 hours helpline - (+91) 11 26895737.

KEY DATES TO REMEMBER:

Here is a list of some really cool animal days in the month of February:

- **World Whale Day** - February 18
- **Love Your Pet Day** - February 20
- **Dog Biscuit Appreciation Day** - Feb 23
- **USDA's Bird Health Awareness Week** - February 24 to March 2
- **Polar Bear Day** - February 27

BIG BANG:

Speaking of animals, we can't help talking about PETA. Founded in March 1980, PETA is an organization that has been diligently fighting for animal rights. PETA is a non-profit corporation with 300 employees, and claims to have three million members and supporters across the globe. This makes it the largest animal rights group in the world. Every year, PETA holds a number of events for animal welfare.

To contribute, log on to the PETA website: www.peta.org ■



Egg bulb

by Pushkar Samant

*Can you make an egg glow without breaking it?
Here is the magic.*

Take a raw egg and place it in a glass. Pour some vinegar till the egg sinks in it. Keep the glass aside for at least two days. You can see bubbles around the egg.

After two days, take out the egg and wash it under the tap water carefully. Gentle rubbing should take out the softened shell. Remember that the egg becomes soft and it might get messy if you press it hard. Once the whole white shell is gone, place the egg on the table. Switch off the lights and

shine a torch or LED from one side of the egg and see the magic!

A chemical reaction takes place between vinegar (acetic acid) and the shell of the egg (calcium carbonate), making the shell soft and translucent. The reaction gives out CO₂, the reason for the bubbles around the egg, and water. ■

Mother Nature has gifted some living organisms with the ability to use chemicals and give out light.



Watch the video at: www.bwmag.in/feb2014videos

Can you name some such organisms and chemicals? Email to brainwave@ack-media.com

The most original response can win you cool gifts worth Rs. 150!

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MIND it!

Experience a world of different sensations, where the birds and the bees have interesting conversations.

Written by
Joanne Carlo
Illustrated by
Sarthak Sinha

She walked with swagger, her tail up in the air,
Master and Puppy, they made a wonderful pair!



Everyday in the morning they
strutted down the streets,
greeting all who came forward
with yummy-wummy treats!



Until one day, the
Master, he'd been
given a strange
power!
Oh boy, t'was more
exciting than any
sprinkly, pink shower!

He could hear, he could hear!
The birds and the bees, the dogs and
the cats, the fish in the pond
and even those beyond.



As happiness besot him,
little did he realise,
the chorus of voices around
had suddenly come alive!



The Puppy
barked loudly
"Hurry up you
silly boy,
I really need
to go."

"What on earth," thought the
Masta,
"That almost sounded like my
sister Moe!"



"Hahaha," purred the cat as she licked her dainty paws.

"I heard that," grumbled the Master as he decided to play leader, and put down his own laws!



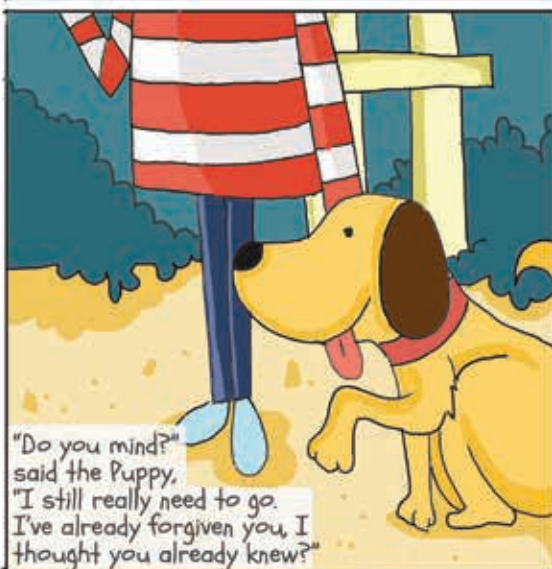
Outside, the birds were angry, grumbled loudly they did. Their worms had been kidnapped for fishing, leaving them all hungry, and dreaming of Madrid!



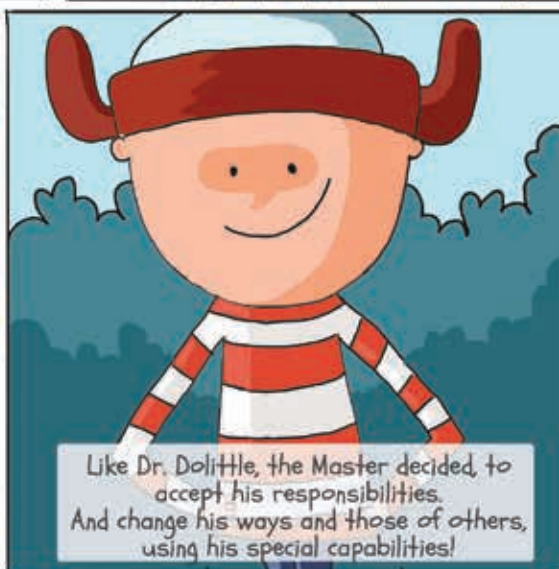
The fish were sick 'cos of all the garbage in the pond. "Cough, cough," they all went, as they loudly wished for Harry Potter's wand!



The Master looked at his Puppy, with sorrow in his eyes. Sorry, and ashamed he was, for the failings of humankind.



"Do you mind?" said the Puppy, "I still really need to go. I've already forgiven you, I thought you already knew?"



Like Dr. Dolittle, the Master decided, to accept his responsibilities. And change his ways and those of others, using his special capabilities!

The End.



Santa's lost Reindeers

by Bhoo

In December, we were celebrating Christmas at the lab. While singing the jingle bells song, our telephone rang. When we switched on the loud speaker, we heard a cry of despair from the other side.

"Who's this?" Arby asked, worried. "Santa here, from North Pole," was the reply. "What is it, Santa? What's up?" enquired Arby. "I lost 3 reindeers this year. The remaining ones are not able to pull the sleigh at enough speeds. That's why I am not able to deliver gifts to many children this year," Santa said, in a very dejected tone.

"But how did you lose them?" Arby queried. "It's been happening since the last five years. This is because of global warming and climate change," Santa burst out with anger. "They simply aren't able to get nutritious food anymore. Climate-change induced rainfall is leading to the formation of a thick layer of ice on their food, a tasty meal of lichen," he added.

We all were shocked.

"Even if the reindeer can get to the lichen, if it has wet ice on it, they aren't able to digest it. And it's not just the reindeers, but also penguins and polar bears. Their habitat and food supply is threatened by climate change," Santa said, his anger really escalating now.

Santa Clause couldn't deliver the gifts to many children this year. He tells us the reason behind it.



"If humans don't start acting now, they shouldn't blame me in the future for not delivering gifts to any child!" Santa hung up the phone furiously and we stopped partying, to start thinking. ■

.....
List out ways to reduce global warming. Research and email your thoughts to Bhoo at brainwave@ack-media.com to get a chance to be nominated for our Student Board as well as to win a surprise gift!
.....



Fishy Farms

by Joanne Carlo

Get your swimming gear ready as we dive into the world of fish farming!

If we had to sit down and chat about farming and types of farming, it would definitely take longer than the making of 'The Lego movie', which took only about 6 years, by the way.

So, let's talk about a type of farming that you've probably not heard of, shall we? Fish farming! Also called pisciculture, it's the principle form of **aquaculture**^G. Just like we rear poultry, fish is bred in tanks. The yummy salmon that we gorge on and the cod from which we get cod liver oil are some of the types of fish raised this way.

To benefit the economy, many states are now supporting pisciculture. For the benefit of farmers, they are organising

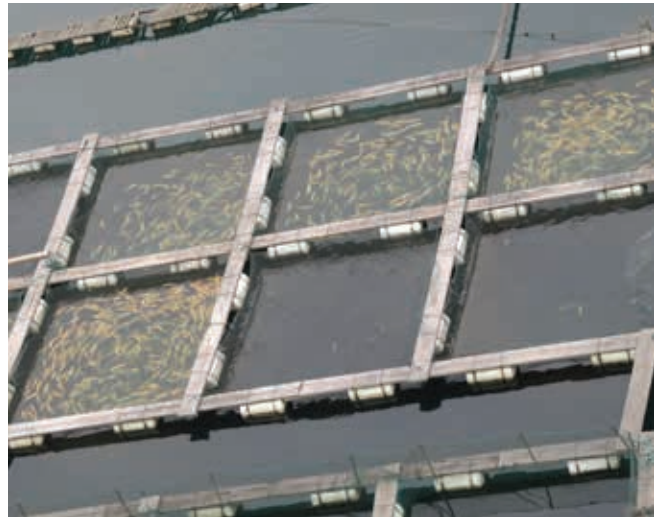


Image Source: Wikimedia Commons

training programs to teach how to get high productivity. By importing seedlings from Korea, India aims to produce 52 tonnes of fish per hectare! Whoa, that's a lot! ■

Did you know?

You can tell the age of some fish by counting the rings on their scales!

Shear Joy

What happens when Shrek the sheep hid for 6 whole years? Read on to find out more!

Whenever I think about shaving the hair off fluffy sheep, I feel a bit bad. But then, I think about good ol' Shrek and I cheer up immediately! No, no, not the ogre Shrek. I'm referring to Shrek the Sheep - a name inspired from the fictional character. And rightly so!

Shrek avoided being caught and shorn for six whole years! How? By hiding in caves!

A **Merino sheep**^G, he needed to be shorn at least once a year. So, when found after six years without his annual haircut, he was lugging around 27 kgs worth of fleece! That's enough to sew suits for 20 men!

Fluffy Shrek got so famous that his fame raised a whole lot of money for many charitable organizations devoted to finding cures for life-threatening illnesses that affect children. Shear joy for the lil' ones, indeed! ■

Did you know?

About 150,000 hair strands are growing on your head right now!



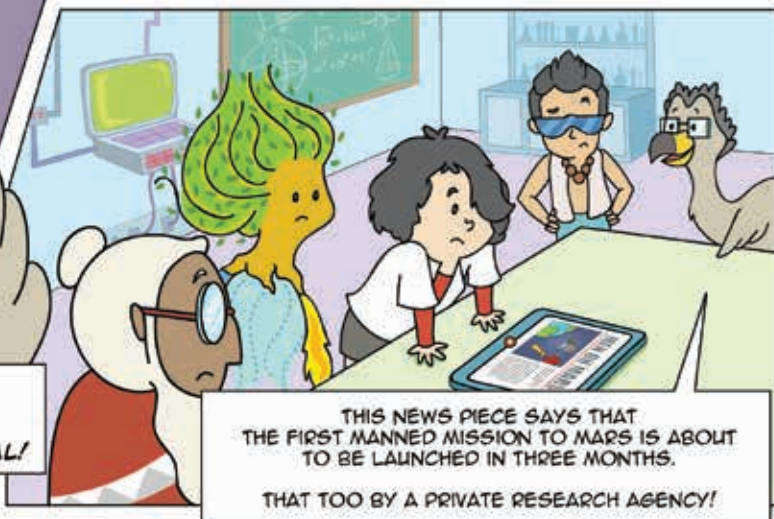
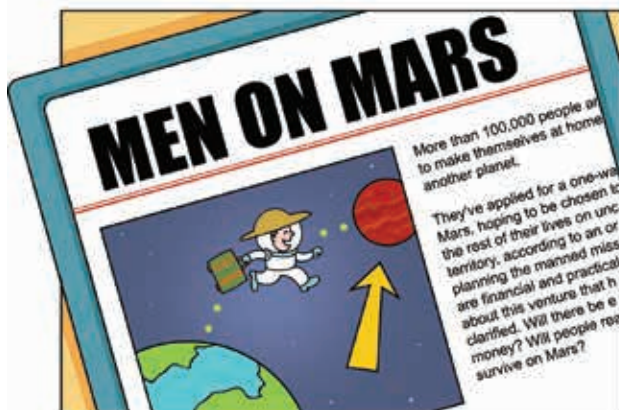
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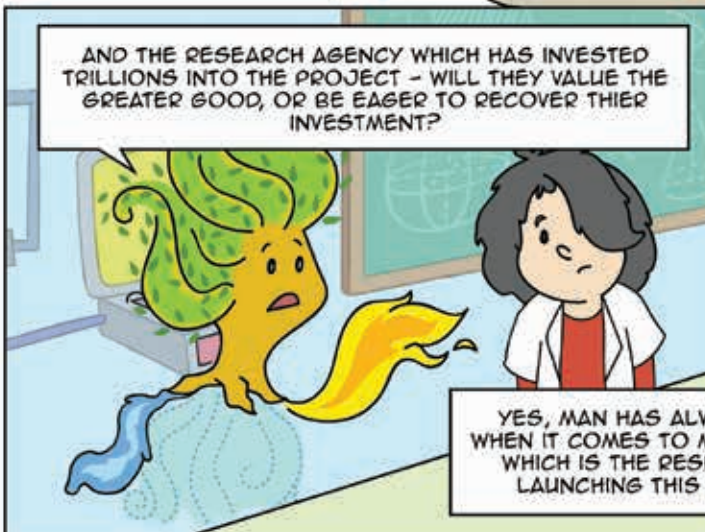
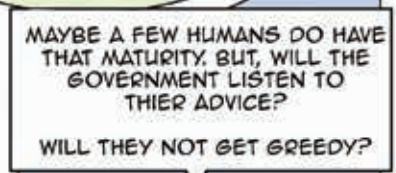
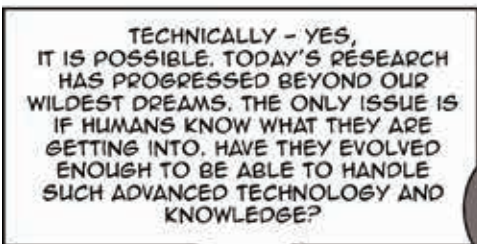
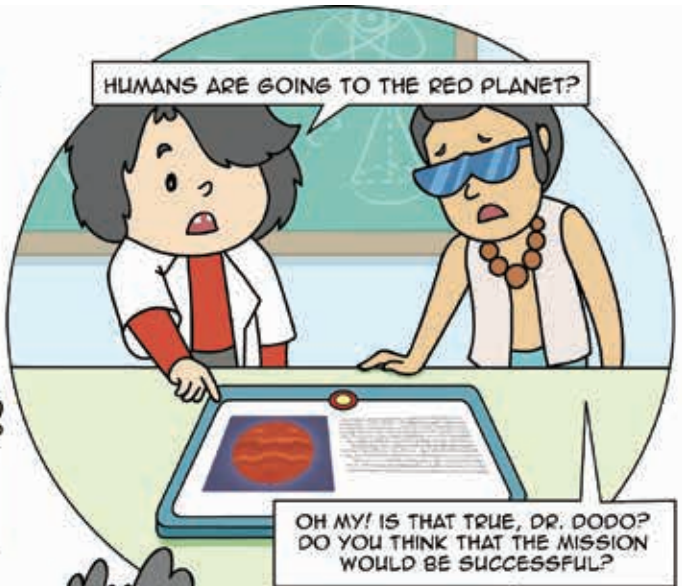
MEN ON MARS

EPISODE 1

STORY: SASIKANTH C

ART & LETTERING: POOJA PRABHAKARAN







I always live with a tight collar, says Ajoba, the leopard.

Live with tight collar

by Pushkar Samant

Few years ago, I was lost in a jungle of buildings, flyovers, roads and much more. I realized that I had reached human territory. But, before I could turn around and leave the human habitat, I fell into a deep sump. After struggling for a few hours there, I was rescued by some firemen.

They took me to a lab. The doctors there checked me thoroughly. The scientists and researchers there hung a ring like object around my neck. They called it the animal tagging and tracking device.

The device was amazing. Animal tracking data from

the device will help them understand how individuals and populations move within local areas, and migrate across oceans and continents. This information can be used to address environmental challenges such as climate and land use change, biodiversity loss and the spread of infectious diseases.

The radio collar around my neck emits a very strong radio signal that can be used to locate me. I learnt that there are many other devices such as the GPS tag that calculate the location of an animal at specific time intervals using positions estimated by satellites. These devices are placed around the neck or

below the tail.

There are also some tagging devices such as microchips, which are injected into the body of an animal.

I must say that though humans have hurt wild life badly, they are now really trying hard to save what is left. I was freed into the jungle soon.

Few months later, I met the firemen again in a different location. I smiled and thanked them. But I guess that they did not understand my language. So, I am sending my story to Brainwave. Please publish it in your magazine. ■



THE POWER OF A HORSE

Why do we call it horsepower and not elephant-power?

by Alby

How did horsepower become a unit of measurement?

In 1755, when Scottish inventor James Watt received a patent on his steam engine, horses were being used to draw coal to a mine's surface. After calculating that one horse had the power to pull 330 pounds 100 feet in one minute, he proved that one steam engine could replace an entire herd of horses. His invention was indeed amazing. And it gave us the formula to interpret engine capacity in horsepower.

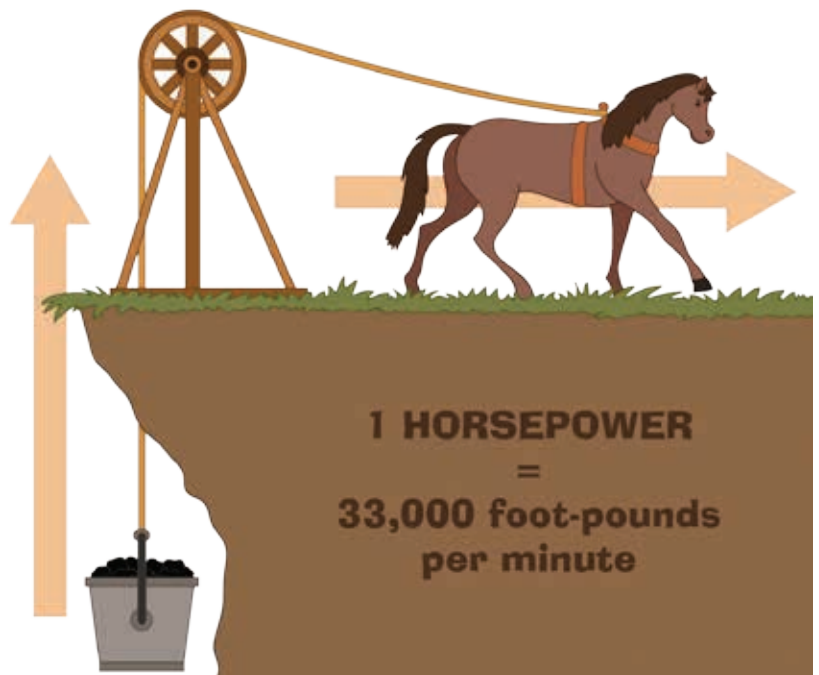
Why not elephant-power?

The people who coined this term had much more contact with horses than with elephants. So, horsepower became popular. Had the term been established in Africa or Asia, maybe we would have been using the term 'elephant-power'.

The early use of this unit was limited to coal mines. However, James Watt applied the unit to steam engines. The power of railway engines then, and even now, is measured in horsepower.

Horsepower rates the engine performance of cars. The more weight you have, the more power it takes to accelerate it. If you want a fast car, you want a good power-to-weight ratio. You want lots of power and minimal weight.

Apart from cars and locomotive engines, horsepower is used in electric motors. ■



Spot them if you can!

Nature has some mind-blowing ways of protecting its creatures. Let us take you through some of the most stunning disguisers of the animal kingdom and the science behind them. **by Dr. Dodo**

Image Source: Wikimedia Commons

Leafy Lands

The Satanic Leaf-tailed Gecko

This gecko is a master of disguise. If you were to look at this creature out in the open, all you would see is a twisted, dead leaf! The satanic leaf-tailed gecko varies in colour, but is often mottled brown. Small black dots on the underside help distinguish it from similar species. This creature is so carefully disguised that its twisted body, veined skin and tail look remarkably like it has been nibbled at by insects, or decayed.

Geckos possess no eyelids, just a transparent covering over their eyes. So they use their long tongues to wipe away any dust or debris that gets into the eye.

The strongest weapon this chameleon has is its capability to compress its body laterally and produce a stripe down its side, mimicking a dead leaf!

Did you know?

A common misconception is that chameleons use their color-changing abilities as camouflage, but they actually use this to court, or show stress or emotion.

Crawling Creeps

Stick Insects

These insects are just like trees! Found in tropical regions across the globe, these tropic species vary from stick like species to those resembling bark, leaves and even moss or lichen.

To look just like the tree they are on, it is said that these insects make rhythmic, repetitive side-to-side movements like vegetation moving

Bearded Leaf Chameleon

Making it to our list and giving the gecko a tough competition is the bearded leaf chameleon. This camouflage guru is usually brown or tan coloured. But, it is also quite capable of changing its colour, and adapting to a range of colours such as yellow, green, orange, black and brown.

in the wind. It is also believed that this swaying movement helps them see objects against the background.

Some of these species are able to produce a defensive pungent-smelling volatile spray when threatened. The spray from one species, *Megacrania nigrosulfurea*, is used by a tribe in Papua New Guinea as a treatment for skin infections!



Image Source: Wikimedia Commons

The Golden Tortoise Beetle

This stunning metallic gold beetle belongs to the leaf beetle family and is a native to the Americas. Generally 5 to 7 millimeters in length, this beetle can change its colour from orange to gold. This colour change takes place seasonally or when the beetle feels threatened. To moderate its colour, the beetle changes the flow of fluid between the layers of its cuticle.

Diving Deep

Pygmy Seahorses

When under the sea, some of the best camouflage techniques are displayed by the pygmy seahorses. These little guys are among the smallest seahorse species in the

world, measuring less than 2 cm in height.

These seahorses live exclusively on corals and match their colour and appearance to accuracy. This hidden species was discovered only when a coral was being examined in a laboratory!

A few other species of pygmy seahorses live on soft corals or are free-ranging among seagrasses and algae.

Cuttlefish

Sad as it is, these fish are colour-blind. But mind you, they have the amazing ability to change the color of their skin. Cuttlefish can control the contraction and relaxation of the muscles, which in turn allows them to moderate the levels of pigment, and change colour.

This is how cuttlefish change their color at will, to match their background, for camouflage. But how do they know what colour to match to?

These fish have reflecting plates that are specialized to reflect certain wavelengths of light and are used to create shimmering color effects on the skin. Now, is that advanced or what! ■



Image Source: Wikimedia Commons



Treasure Hunt!

Dear young readers, we know that you are teeming with ideas and enthusiasm. We hear you. Hence, we are asking you to send us your thoughts about how we can make the Treasure Hunt more exciting.

What do you suggest we do?

We are also sure that you have tens of ideas about the kind of contests we can run on Brainwave. Email those ideas to us, along with details of the game play.

oooooooooooo

The top two ideas that we select and use in Brainwave will win two cool books each, from Leadstart Publishing.

Email to brainwave@ack-media.com with 'Evolve Treasure Hunt 2014' as the subject.

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There are more than 10 activities and contests in each issue. Turn to the index on [p02](#), check the features marked with a '★' out, and participate in them.

What are you waiting for?

www.bwmag.in/category/bw-smartenstein

p05

Scavengers: Scavenging is a feeding behavior in which the scavenger feeds on dead animal and plant material present in its habitat. Scavengers play an important role in the ecosystem by consuming the dead animal and plant material. Decomposers then complete this process by consuming the remains left by scavengers.

p11

Cation: In chemical terms, if a neutral atom loses one or more electrons, it has a net positive charge and is known as a cation. An ion is an atom or molecule in which the total number of electrons is not equal to the total number of protons, giving the atom a net positive or negative electrical charge.

Up-regulated: Upregulation is a process that makes our body cells more responsive to stimuli, like hormones, in response to environmental cues. One example is that we seen that when people exercise more, the sensitivity of their body cells to insulin increases.

p31

Aquaculture: Aquaculture, also known as aquafarming, is the farming of aquatic organisms such as fish and aquatic plants. Aquaculture involves cultivating freshwater and saltwater organisms under controlled conditions. This is different from commercial fishing, which is the harvesting of wild fish.

Merino Sheep: The merino is one of the world's most ancient breeds of sheep, and one of the toughest. The merino is very different to a regular sheep, which chews grass in the lowlands. Merino lives in the extremes of New Zealand's Southern Alps.

Regular sheep would freeze to death up there.

But the merino's fleece is built for extremes – breathable in summer, insulating in winter, and yet, exceptionally soft and lightweight.

p33

Animal Husbandry: Animal husbandry is the management and care of farm animals by humans, for profit. Genetic qualities and behaviour of the animals, considered to be advantageous to humans, are further developed.

★ Sci-Q Time

Finished reading the magazine?
Answer this quiz to win a **mystery**
gift worth Rs. 200! Email your
answers as soon as possible to
brainwave@ack-media.com

1. What is GPS? How does it work?
2. What is the chemical equation for the reaction between vinegar and egg shell?
3. What are the various stages of the life cycle of a butterfly?
4. Why should we study about animal kingdom?
5. What is a hexagon?

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WHAT IS BRAINWAVE?

Brainwave is a children's science magazine from the house of Amar Chitra Katha and Tinkle.

We understand that each child has a different aptitude and love for science. Hence, we simplify science into forms that excite them - comics, stories, fun-do activities, contests and fascinating facts.

Give your child a Brainwave, and science will be just another game!



Testing...One,Two,Three...

In a world filled with pros and cons, it's for you to figure out whether animal testing will save our planet, or not! by Joanne Carlo

Everybody's worried about plants and their disappearing acts. Without the green that complements the blue, we can kiss our rainfall, fertile soil and much needed oxygen, goodbye!

But, as the green fades into smoky puffs of gray, we aren't the only ones left with the shorter end of the stick. Animals, who swear by trees, are left in a far graver state.

In order to prevent them from going completely extinct, sanctuaries, national parks and bio reserves were built. Just when we thought we had done our best to preserve animals, along came an evil so evil, nobody really knew that it was really, really evil – animal testing!

Animal testing uses animals for experiments and research. While some involve the study of their natural behavior, there are some experiments that are borderline cruel. Two sides of the same coin, animal testing on one hand contributes to many a medical achievement and on the other, the side effects of these tests outweigh the benefits and abuse the rights of these poor animals that cannot speak for themselves!

Since time immemorial, animal welfare organizations have been fighting against the usage of chimps, rabbits, mice and other animals for research and cosmetic testing, citing them as unethical and scientifically unreliable.

But, there are many who state otherwise. They

claim that animal testing benefits humans as well as animals. Evidently, these tests prevent them from going extinct!

So, does animal testing save them or slay them? You decide. ■

Did you know?

Dinosaur bones were mistaken for dragon bones when they were first discovered more than 2,000 years ago!



Image Source: Daily Herald

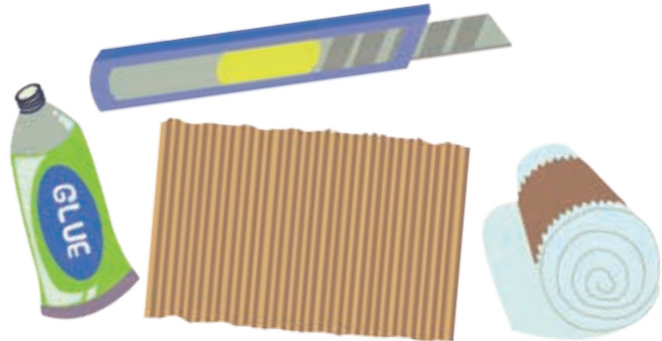


A Sheep's HairCut

by Pushkar Samant

You will need

- 1) Cardboard
- 2) Cotton Roll
- 3) Glue or Gum
- 4) Paper cutter



Artwork: Saudamini Tamboy

METHOD:

1

Take a square piece of a cardboard. Apply the glue all over one side of it.



2

Cut a square out from the cotton roll. Stick it to the side of the cardboard where glue is applied.





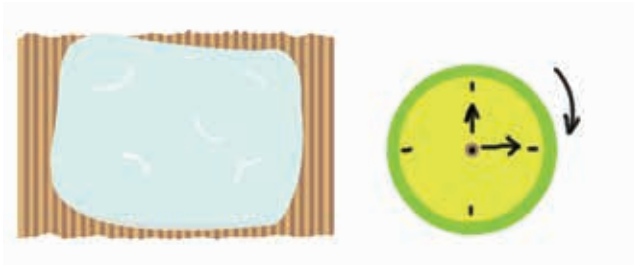
3

Apply pressure to the cotton so that it gets stuck perfectly to the cardboard.



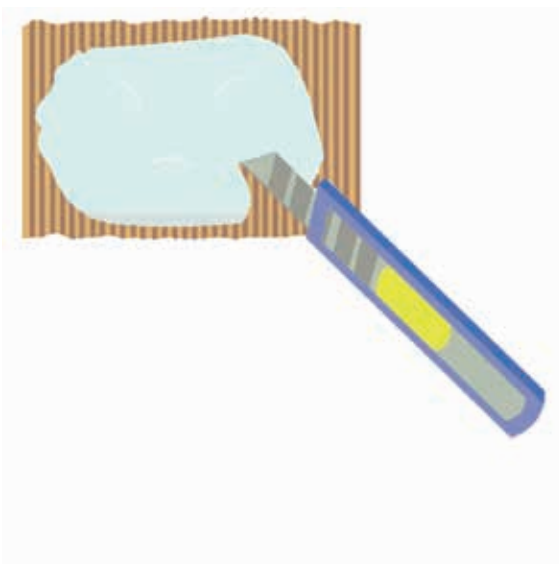
4

Let it dry for some time, ideally for an hour.



5

Take the paper cutter and try to separate the cotton from the cardboard as a whole, without cutting the cardboard sheet.



What do you observe?

What we just tried out is a demo of shearing. Cutting or shaving the wool of a sheep is called shearing. If done carefully, it doesn't hurt the sheep. It's just like getting a hair cut.

In this case, the cardboard is like the body of the sheep, and the cotton stuck to it is the wool.

Shearers use shearing machines to cut the wool. As you have seen, it is not easy. Shearing requires skill so that no injury is caused to the sheep. ■

.....
Sheep need to have their wool removed once a year. Otherwise, they start feeling uncomfortable as the wool grows continually.
.....